

REMARKS

Pending Claims

Claims 1, 3-5 and 7 have been amended and new claims 9-11 have been added. Claims 2 and 8 have been canceled. Accordingly, claims 1, and 3-7 and 9-11 are now pending in the application.

35 U.S.C. §112

Claims 1-8 stand rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2 and 8 have been canceled and remaining claims 1 and 3-7 have been amended to satisfy the Examiner's objections.

35 U.S.C. §103

Claims 1, 6 and 7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ogasawara et al. U.S. Patent No. 5,525,028.

Claims 2-5 stand rejected under 35 USC 103(a) as being unpatentable over Ogasawara et al. as applied to claim 1 above, and further in view of Brucher et al. U.S. Patent No. 5,924,325.

For the reasons set forth hereafter, it is submitted that remaining claims 1 and 3-7, as amended and new claims 9-11, are patentable.

Patentability of the Claims

The present invention as now claimed is directed to a working mechanism for a construction machine having first, second and third booms and a working tool connected to the distal end of a arm connected to the end of the third boom. The mechanism further includes an offset cylinder which is arranged between the first boom and the second boom to swing the second boom to the left and right sides at the distal end of the first boom.

As now defined in amended claim 1, the mechanism further includes a parallel support member formed by a pair of links, which are connected between the first boom and the third boom and which are respectively arranged at left and right positions, provided on the second boom, and the third boom is supported by the parallel support member so as to be parallel to the first boom when the offset cylinder is extended or retracted. Each of the links that constitute the parallel support member has a base end rotatably connected to the first boom by a first joint pin and a distal end rotatably connected to the third boom by a second joint pin. A first pin hole into which the first joint pin is inserted is formed in the base end of the link and a second pin hole into which the second joint pin is inserted is formed in the distal end of the link. One of the first and second pin holes is formed as an oversized hole that the first or second joint pin is inserted into whereby the first or second joint pin is movable in a longitudinal direction of the link.

It is further noted that the links which constitute the parallel support member may be formed by rod members, chains or wire cables.

The Ogasawara '028 patent discloses an offset boom construction machine having a cylinder stay (5) which transfers laterally while keeping a parallel relation to a lower boom (3) when an upper boom (4) is swung laterally upon extension and contraction of the offset cylinder (9).

As shown in Fig. 3, a rod (12) is provided between a bracket (3b) of the lower boom (3) and a bracket (5a) of the cylinder stay (5), and constitutes a parallel link mechanism along with the lower boom (3), the upper boom (4) and the cylinder stay (5).

The Brucher '325 patent discloses a lifting device having a four-bar linkage (5) formed by coupling with a lifting arm (6) and a connecting rod (7) between a carriage holder (4) of a boring machine (1) and a lifting frame (8). Further, this lifting device keeps the parallel relation between the carriage holder (4) and the lifting frame (8) when they are relatively transferred.

According to the present invention, as shown in Fig. 3, for example, a parallel support member 23 formed by a pair of links 24, 27, which are respectively arranged at left and right sides of a second boom 13 and connected between a first boom 12 and a third boom 15, is provided on the second boom 13. A third boom 15 is so supported by the parallel support member 23 as to keep the parallel relation to the first boom 12.

Consequently, in the present invention, the cross sectional areas and the weights of the pair of links 24, 27 can be reduced since these links 24, 27 need not receive a compression direction force caused because of the extension and contraction movement of an offset cylinder 20 when swinging the second boom 13 to the left and right sides at the distal end of the first boom 12.

In contrast with the present invention, in Ogasawara, as shown in Fig. 3, the rod (12) constitutes a parallel link mechanism collectively with the lower boom (3), the upper boom (4) and the cylinder stay (5). In this case, the offset cylinder (9) and the rod (12) are provided at the both left and right sides of the upper boom (4).

Therefore, Ogasawara merely discloses the same structure as the prior art which is described on pages 1-4 of the specification of the present invention. Therefore, the rod (12) described in Ogasawara receives both a compression force and a pulling or tensile force. Thus, the cross sectional areas and the weights of the rod (12) need to be increased. This is one of the problems the present invention overcomes.

With further regard to the present invention, as shown in the Fig. 6, for example, pin holes 24A, 27A and/or pin holes 24B, 27B wherein link joint pins 25-29 are inserted are provided in the base end and distal end of the links 24, 27 and formed as an oversized hole where the pins may move longitudinally since the link joint pins are inserted movably in the longitudinal direction of the links 24, 27.

It appears that the Examiner presumes the joint (23) and bent slot rocker (24) shown in Fig. 2 in the Brucher patent to be equivalent to the oversized hole described in the original claim 2 of the present application. However, Brucher merely discloses a construction which moves the carriage holder (4) and the lifting frame (8) to the upper and lower sides while keeping a parallel relation between the two.

Therefore, the construction disclosed in the present invention which swings the second boom 13 to the left and right sides at the distal end of the first boom 12 due to the extension and retraction movement of the offset cylinder 20 is not disclosed in the Brucher patent.

Further, the construction disclosed in the present invention which provides the offset cylinder 20 and the parallel support member 23 formed with a pair of the links 24, 27, is not disclosed in the Brucher patent.

In the present invention, since the parallel support member 23 is formed by the pair of links 24, 27, the pair of links 24, 27 do not receive any compression force. Therefore, the cross sectional areas and the weights of these links 24, 27 can be reduced as compared to the prior art.

Neither of the cited Ogasawara or Brucher patents provides a pair of links 24, 27 (the parallel support member 23) which do not receive compression force as in the present invention.

Accordingly, claims 1, 3-7 and 9-11 are patentable.

Conclusion

In view of the foregoing amendments and remarks, Applicants contend that the above-identified application is now in condition for allowance. Accordingly, reconsideration and reexamination are respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of Mattingly, Stanger, Malur & Brundidge, P.C., Deposit Account No. 50-1417 (referencing attorney docket no. H&C-5482).

Respectfully submitted,



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